



Au Virtual International Conference 2020
Entrepreneurship and Sustainability in the Digital Era
Assumption University of Thailand
October 30, 2020
Co-hosted by



THE DEVELOPMENT OF HIGHER SECONDARY BUSINESS SKILLS LEARNING MODEL USING WHOLE BRAIN LITERACY (WBL) AMONG TENTH GRADE STUDENTS MONTFORT COLLEGE SECONDARY SECTION, THAILAND

Warinthrone Vasuwat^{1*}, Nopasit Chakpitak²

Tanarat Rattanadamrongaksorn³ and Piyachat Udomwong⁴

¹⁻⁴*International College of Digital Innovation and Financial Technology,
Chiang Mai University, 239 Nimmanhaemin Road,*

Suthep, Muang, Chiang Mai, 50200 Thailand

**Corresponding author. E-mail: warinthrone_v@cmu.ac.th*

Abstract

This research aim to study, analyze and develop business skills learning model in Grade 10, Montfort College Secondary Section: Chiang Mai, Thailand. The proposed method was to analyze characteristics and develop business skills learning model based on needs of higher secondary students - parents and those who succeed in the business field in Thailand. The proposed method was developed by employing Whole Brain Literacy (WBL) theory. Then, collected data were analyzed to determine characteristics of subject groups and required skills to be developed. The Finding from this study revealed that significant factors used for developing business skills learning model is accord with the most required skills for subject are creative and adaptive skills which mean and S.D. values were 36.63 and 5.51, respectively. The least required skills for subject are team building and communication skills which mean and S.D. values were 19.70 and 6.73, respectively.

Keywords: Whole Brain Literacy, Business Skills Learning Model, Brain Map, Brain Based Learning.



Introduction

Rapid development of technology and innovation has resulted in social revolution, changes in economic structure, people’s learning styles both inside and outside the classroom, as well as decision on future careers. Nowadays (2020), the global society is passing 4G: Information Society into 5G era (society 5.0): Super Smart Society. OECD (2018) is predicted that in 2030, learning styles in schools and attitudes towards occupation around the world will be completely changed. New subjects will be added to study programs in many schools and universities (UNESCO, 2017). Also, weird, new, and unpredictable jobs will be created. Most students are likely to be self-employed, start a start-up business, and do an online marketing or e-commerce. They will prefer not to apply for a routine work. Additionally, relevant studies revealed that the number of students who can earn money by themselves while studying at secondary school and university has been increasing (UKCES, 2014).

This study aims to develop business skill learning model for tenth grade based on Whole Brain Literacy (WBL) theory. The study is conducted on tenth grade students in Montfort College: Secondary Section, Thailand. The study was designed in order to find significant factors used for developing business skills learning model. The study included the needs of developing learning styles and business skills according to students and parents’ needs and future trends.

Literature Review

Tayko and Talmo (2010) presented WBL as a tool for leaders, managers, executives, and supervisors to manage their thoughts, feelings, tasks and time in order to be more creative and productive for their sustainable system. The four-brain model, referred to as the thinking styles of brain functioning, can be analyzed as I-control (I-C): thinking about certainty and stability, I-explore (I-E): thinking about ingenuity and creativity, I-pursue (I-PU): thinking about results and productivity and I-preserve (I-PR): thinking about relations and integration.

Whole Brain Literacy (WBL) helps to manage thinking, feeling, and other things in life for better, more creative and productive (Tayko, et al., 2017)

Lynch (1986) explained Whole Brain Literacy (WBL) is a modern educational philosophy that analyzes cognitive process, response, and human learning resulted from brain functions in 4 lobes for the human development to understand oneself, others, and society with diverse and broadened perspectives based on individuality and peaceful coexistence. It can be divided as shown in Figure 1.

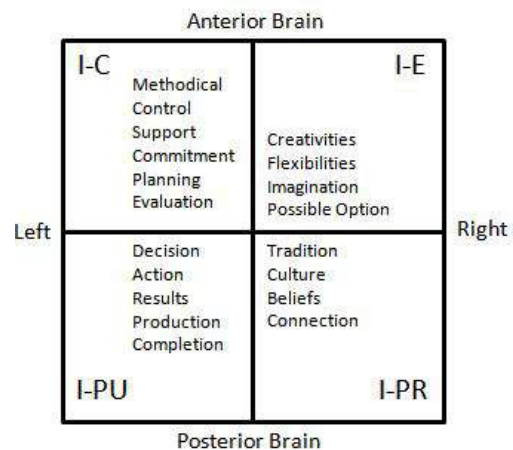


Figure 1: The Four-Brain Model

Soponkij (2010), WBL is a tool for change in many settings where learners with non-linear thinking patterns develop their potentials to perform tasks. As Organization Development Implementations (ODIs), WBL and Appreciative Inquiry (AI) significantly change leadership styles, shared values, skills and employee satisfaction.

In the same vein, Vongbunsin (2010) argued that, as an OD tool, WBL had a positive impact on the performance of the individual rather than the group.

Herrmann (2015) described whole brain thinking is a scalable framework which provides a lens for improved understanding and insight. It acknowledges that different tasks require different mental processes, and different people prefer different kinds of thinking. Whole brain thinking helps organizations get better results when they can



strategically leverage the full spectrum of thinking available.

Research Objectives

This study actually contains three different components as follows:

1. To analyze and classify students - parents' needs towards providing business skill learning program for tenth grade students in Montfort College Secondary Section by employing WBL theory as an analysis base.
2. To analyze and classify personalities, attitudes and skills of successful people in business field with a great reputation in society and national level by using the WBL as an analysis base.
3. To compare and develop business skill learning model for tenth grade students in Montfort College Secondary Section by using the WBL as an analysis base.

Scope of Research

The study is focused on three scopes of research such as

1. Scope of Content

The studies, designs, and develops business skill learning model in grade 10 consisting of 4 skills based on WBL process such as subjects requiring creative and adaptive skills (I-Explore: I-E), subjects requiring critical thinking and problem-solving skills (I-Control: I-C), subjects requiring team building and communication skills (I-Preserve: I-PR), subjects requiring time management and organizing skills (I-Pursue: I-PU).

2. Scope of Data

The survey focused on Montfort College (MC), Secondary Section: Muang Chiang Mai Thailand. One of the leading schools in the country, Now in its 89th year of existence and there are 3,300 students both lower and higher secondary.

3. Population and Sample

300 higher secondary students and 200 parents in an academic year of 2020 were selected by random sampling (Sample Random Sampling: SRS). Also, 6 successful business people with a great reputation in society and national level (20-year experiences in business field with property value above one hundred billion baht) were interviewed. One of those was interviewed but the others were studied and analyzed their interviews from other sources.

Conceptual Framework

The conceptual framework in this research was analyzing, comparing, designing, and developing business skills learning from factors as follows:

- Higher secondary students' needs.
- Parents' needs.
- Those who are successful in business field with a great reputation in society and national level.
- The analysis employed WBL theory in order to effectively enhance students to have business skills and meet the criteria consistent with the developed curriculum model as shown in Figure 2.

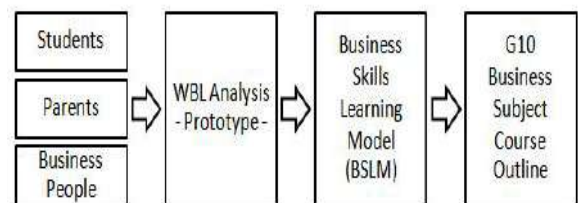


Figure 2: Research Conceptual Framework

Research Methodology

1. This research aims to seek for guidelines, needs, and expectations towards providing business skills learning program for grade 10 students, Montfort College in order to develop the business subject model.
2. Tools for Data Collection: The study is comprised of three data collections are as follows:
 - Checklist questionnaire of students and parents' needs and expectations on providing business skill learning program for high school consists of 3 sections such as Section 1: Survey regarding to



personal information of students and parents such as sex, grade level, studying program, age, career, education level, etc. Section 2: Survey regarding to students and parents' needs and expectations on 7 factors including a factor of expected curriculum management, a factor of location, a factor of required learning, a factor of the most needed business topics the school needs to develop for students, a factor of reasons for enhancing business skills, a factor of relating expectations on educators (teachers – lecturers – speakers), a factor of relating needs on developing other skills in the curriculum (based on 21st century learning skills) and Section 3: Other Suggestions.

- Open-ended interviews on factors relating personalities, attitudes, and skills of 6 successful businesspeople with a great reputation in society and national level (20-year experiences in business field with property value above one hundred billion baht) by criterion based selection with an interview for 1 person and studying – analyzing the other interviews based on WBL and The interviews were decoded in order to analyze interviewees' qualifications, characteristics, and skills following by WBL process are shown in Table 1.

Table 1: The characterization of interviewees in business field

Types of Interview	Business Rank of Thailand	Property Value (hundred billion THB)	Status	Types of Business
Interview	Province level	-	Alumni	Shopping mall
Analysis of interview from sources	The 1st	9.41	-	Food
	The 2nd	6.70	-	Shopping mall
	The 4th	5.17	-	Beverage
	The 5th	1.66	-	Energy
	The 7th	1.08	-	Medicine

- Data collection and statistical analysis based on WBL to classify a survey and an interview for sampling group in 4 aspects are showed in the Table 2.

Table 2: Classification of statistical analysis based on WBL

Brain Function	Business Skills
1) Anterior Left Brain: I-Control : I-C	Critical Thinking and Problem-Solving skills
2) Anterior Right Brain: I-Explore: I-E	Creative and Adaptive skills
3) Posterior Left Brain: I-Pursue : I-PU	Time Management and Organizing skills
4) Posterior Right Brain: I-Preserve: I-PR	Team Building and Communication skills

- Statistics values were used for data analysis comprising of percentage, mean and Standard Deviation (S.D.).

3. IPO Model

- Skill designing and all 7 factors applied in the survey by using system process (IPO Model: Input-Process-Output) were brought to prioritize factors and surveys in the research as shown in Table 3.



Table 3: IPO model and prioritization of surveys

Process	Status	Prioritization of Factors		
		- Questions Needed to Be Investigate		
Input	Student	Gender	Grade level	Studying program
		Parent	Gender	Status
	Parent	Educational level	Career	Grade of students
		Students studying program		
Process (6 Factors)	Location		Desired curriculum management styles	
	Desired learning styles		Business topic needed to be improved the most	
	Other skills needed to be added during class (based on 21 st century learning skills)			
Output (1 Factor)	Reasons for developing business skills			

Results

The survey results of factors relating high school students and parents at Montfort College, also successful businesspeople in the country's need towards providing business learning skills for high school students to classify functions based on WBL are demonstrated in Table 4.

Table 4: The results of average mean and S.D. analysis of sample groups based on WBL

Sample Group	Analysis Results Based on WBL (Percent)			
	I-PU	I-C	I-PR	I-E
Students	19.55	25.36	15.40	39.68
Parents	28.77	25.63	16.24	29.35
Business People	14.37	20.28	27.46	37.88
Average Mean	20.89	23.09	19.70	36.63
S.D.	7.29	2.68	6.73	5.51

According to Table 4, it indicated the directions and needs of students and parents, as well as successful business people's attitudes towards business skill learning as follows. The most important skills that the students and parents desired to develop were creative and adaptive skills (I-E) with the average percentages of 39.68 and 29.35, respectively. On the other hand, the least important skills that the students and parents desired to develop were team building and communication skills (I-PR) with the average percentage of 15.40 and 16.24 respectively.

However, in business people's perspectives, there were some similarity and difference from students and parents'. The most important skills for business learning were creative and adaptive skills with 37.88 %. Conversely, the least important skills were organized and time management skills (I-PU) with 14.37 %.

After that, the results from the surveys were displayed in the form of brain map in order to realize the directions of 3 sample groups' needs based on



Whole Brain Literacy in 4 parts which are shown in Figure 3.

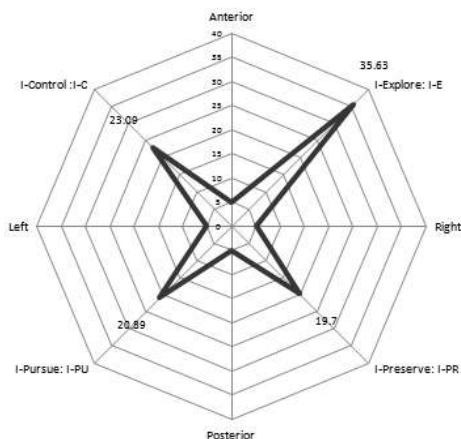


Figure 3: Analysis of sample groups' needs comparing with 4 - parts human's WBL Brain Map

As shown in Figure 3, it depicted the relationship between 4 skills based on WBL process and brain structure model or brain map for developing the business skills learning model (BSLM), which can be explained as follows.

- The survey samples were needed to develop business learning skills from the right brain process the most (creativity and relationship with others) with the total average percentage of I-Explore and I-Preserve of 55.33.
- The skills arising from the left brain process (logical thinking and analyzing) had total average percentage of I-Control and I-Pursue of 44.67, preceded by skills from left brain process.
- The average percentage of differences in the needs of business skill development between right and left brain among the survey groups was 10.66 percent.
- The most important discovery from the brain map model was that all of students, parents and business people specially focused on the business learning skills functioning mainly on anterior right brain or I-Explore (I-E). This part of the brain functions in creativity, imagination, future vision, new

innovations, and thinking outside the box with the percentage of 35.63, which was the most desired skill among 3 sample groups.

- The skills that the sample groups from the survey needed to develop the least were the skills from posterior right brain which functions in team building, relationship with others, emotions, and communication (I-Preserve: I-PR) with the percentage of 19.70.

Analysis

Findings Summarization

The sample groups desired to develop business skills as follows: 1) The highest students and parents' expectation of business skill is subjects requiring creative and adaptive skills (Anterior right brain: I-Explore: I-E) which average mean was 36.63 and S.D. was 5.51 and also 2) subjects requiring critical thinking and problem solving skills (Anterior left brain: I-Control: I-C) which average mean was 23.09 and S.D. was 2.68. Moreover, 3) Subjects requiring team building and communication skills (Posterior right -brain: I-Preserve: I-PR) is the lowest learning skill of stakeholders' needs which average mean was 19.70 and S.D. was 6.73 and the last subject requiring time management and organizing skills (Posterior left brain: I-Pursue: I-PU) which average mean was 20.89 and S.D. was 7.29. The results are exhibited in Figure 4.

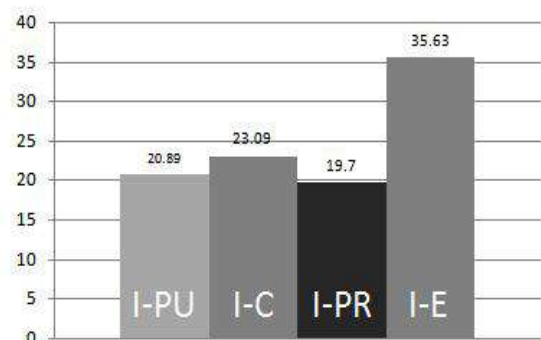


Figure 4: A comparison of sample groups based on Whole Brain Literacy (WBL)

Then, the results were applied for the development of a business skills learning model



(BSLM) in the proportion of 4 skills, shown in Table 5.

Table 5: Proportion of Brain Learning Functions

Business Skills Learning Model			
Proportion of Brain Learning Functions			
I-PU	I-C	I-PR	I-E
Time Management and Organizing skills	Critical Thinking and Problem Solving skills	Team building and Communication skills	Creative and Adaptive skills
2	2	2	4

The proportion above can be applied to plan and develop an additional business skill learning course in grade 10, Montfort College, shown in Table 6.

Table 6: The Prototype Course of Business skills learning in grade 10 at Montfort College

Grade 10 : Business Subject Course Outline			
Student Club : 2 Hours / week			
Semester 2 Academic Year 2020			
Montfort College Secondary Section			
Total : 40 Hours / Semester			
WBL Functions	Unit / Topic	Period (Hrs)	Total Semester
I-PU (Ratio = 2) Time Management and Organizing skills	- Introductory of Business	2	8
	Project	2	
	-Business Flow Chart - Business Plan	4	
I-C (Ratio = 2) Critical Thinking and	-Critical Thinking Activity	2	8
		2	

Problem - Solving skills	-Decision Making Activity -Design Thinking for Business	4	
I-PR (Ratio = 2) Team Building and Communication skills	- Team Building Activity	2	8
	- Online Marketing Dialogue -Business Communication Techniques	4	
I-E (Ratio = 4) Creative and Adaptive skills	- Business Project	2	16
	- Digital Start –Up	2	
	-Business Strategy	2	
	+ 1 Business Internship (Domestic) + 1 Overseas Field Trip (Optional)	10	
Total		40	

According to Table 6, it shows the designing of business skills course outline in grade 10, English program, Montfort College Secondary Section in the 2nd semester, academic year of 2020 for 20 weeks (40 hours). The course was designed to be taught for 2 hours per week based on BSLM from the analysis of WBL process. The relationship ratio of brain function or WBL among I-PU: I-C: I-PR: I-E was 2:2:2:4. The course structure can be explained as follows.

- Subjects requiring time management and organizing skills (I-Pursue: I-PU) were determined for learning for 8 hours, consisting of the following topics: Introductory of business project for 2 hours, Business flow chart for 2 hours, and Business plan for 4 hours.

- Subjects requiring critical thinking and problem-solving skills (I-Control: I-C) were set for studying for 8 hours, consisting of the following topics: Critical thinking activity for 2 hours, Decision making activity for 2 hours, and Design thinking for business for 4 hours.

- Subjects requiring team building and communication (I-Preserve: I-PR) were determined to require 8 hours for learning, consisting of the following topics: Team building activity for 2 hours, Online marketing dialogue for 2 hours, and Business communication techniques for 4 hours.

- Subjects requiring creativity and adaptivity (I-Explore: I-E) were determined to require 16 hours for learning, consisting of the following topics: Business project, Digital start-up, and Business strategy. Moreover, students are required to participate in business internships (domestic) outside the classroom for 1 time with no less than 40 hours to gain experiences in business field from real workplaces. Also, students are able to participate in business study abroad program (voluntary) for 1 time.

Conclusions

- From the survey, the business skills learning model in grade 10, Montfort College, semester 2, in the academic year of 2020 was developed based on WBL process (40 hours/semester). The total units learned were 13 (according to the Table 6). All 8 skills used to design and develop the model included time management and organizing skills, critical thinking and problem-solving skills, team building and communication skills, also creative and adaptive skills.

- The analysis and comparison of studies employing WBL for the development of educational model since 2006, it was revealed that this research develops more skills than the other researches as shown in the Table 7.

Table 7: Comparison of WBL studies in business and the related field

Name of Researcher (Year)	Sample Group	Developed Learning Skills	The number of skills
Researcher 2020	High school	Time management and Organizing skills, Critical Thinking and Problem-solving skills, Team building and Communication skills, Creative and Adaptive skills	8
Puntharee I. 2019	University	Thinking and Action-Related skills, Creative and Relationship skills, Self-management and Life skills	6
Salvacion E. 2015	University	Problem-Solving skill	1
Thitiya D. 2011	University	Ethics skill	1
Ann B. 2011	University	Thinking and Perspectives skills	2
Trinetia R. 2006	Middle school	Art skill	1



- The sample groups focus on creative and adaptive skills the most for learning business subjects with the average mean of 36.63 %. For these skills, the students can develop their business skills by designing business projects, doing digital start-up, planning business strategies, as well as internship outside classroom and abroad field trip (for 16 hours).
- The developed model will be used with students in grade 10, Montfort College in order to analyze and compare learning achievement before and after an experiment. The 2 sample groups are control and experimental groups (40 hours of business subject).

1. Policy Recommendation

Once the statistical test reveals that the developed model influences students’ business learning skills, it will be presented to school board of directors for consideration and approval of this program. Also, the model will be applied to the relating subjects of Art-Business studying program at Montfort College secondary section.

2. Further Study

- It is expected to develop business skills learning model from successful people ranked at the top 10 in the world and international level (Forbes, 2020) such as Bill Gates, Warren Buffett, and Mark Zuckerberg etc. Therefore, quality and standard of teaching and learning in Thailand can be enhanced so that students can develop skills and knowledge comparable to international standard based on WBL process. The conceptual framework of research is illustrated in Figure 5.

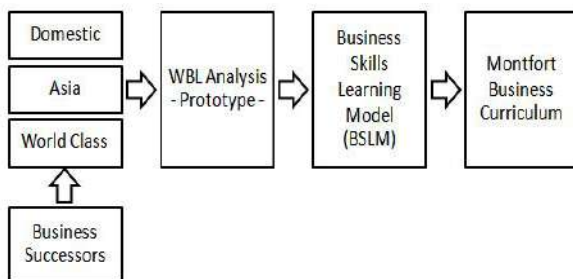


Figure 5: Conceptual Framework of the further study

- To make this research more complete, more samples relating foreign students and parents who came to Chiang Mai for studying such as Chinese, Korean, Indian and Japanese should be added. Furthermore, there should be both qualitative and quantitative data collection to specify the framework of sample groups’ needs in more details.
- This study revealed that WBL process can be applied for analyzing population relating to education and designing – developing other courses’ skill learning model in the future such as digital innovation, invention creation, financial technology, and computer program design, as well as concept mapping – various policies related to education.

Acknowledgements

I would like to express my special thanks of gratitude to Bro. Dr. Surakit Srisrankulwong, the director of Montfort College for supporting the research scholarship, Dr. Sirichai Preudhikulpradab, Program Director and Lecturer of Master of Management (Organization Development and Management) Graduate School of Business Assumption University, Dr. Narong Thananuwat, an honorary consul of the Kingdom of Belgium, and Dr. Narong Kongprasert, an honorary consul of the Republic of Finland, district 11, Chiang Mai for their able guidance and support in completing my study.

References

Bougie, R. &. (2010). *Research methods for business: A skill building approach*. NY, USA: John Wiley & Sons Ltd.

Bunderson, C. (1995). *The validity of the Herrmann Brain Dominance Instrument*. USA: Qubecor Printing Book Group.

Buzan, T. (1991). *Use Both Sides of Your Brain*. USA: Plume Books.

Disphanurat, T. (2013). Enhancing and enriching students’ learning styles and performance through Whole brain literacy (WBL) and appreciative inquiry (AI) interventions: A case study of ethics classes. *Doctoral Dissertation*.

Dunman, B. (2006). *The Effect of Brain –Based Instruction to Improve on Students’ Academic*



- Achievement in Social Studies Instruction.* Mugla University.
- Fishback, S. (1999). *Learning and the brain. Adult Learning.*
- Gardner, H. (1993). *Multiple Intelligences: The Theory in Practice.* New York, USA: Basic Books.
- Garner, H. (1991). *The unschooled mind: How Children Think and How School Should Teach.* New York, USA : Basic Book.
- Harvey, D. &. (2006). *Organization Development.* NJ, USA: Pearson Education Inc.
- Herrmann, N. &.N. (2015). *The Whole Brain business book: Unlocking the power of whole brain thinking in organizations.* McGraw Hill Professional.
- Herrmann, N. (1995). *The Creative Brain.* USA: Qubecor Printing Book Group.
- International, H. (2015). *Whole Brain Model.* Retrieved from www.hbdi.com
- J.W, S. M. (1996). Forming student project teams based on Herrmann Brain Dominance results. Washington DC: American Society of Engineering Education (ASEE) Annual conference.
- Jensen, E. (2008). *Brain-based Learning (2nd Edition).* Thousand Oaks, CA: Crowin Press.
- Kuratko, D. (2011). *Entrepreneuership Education: Emerging Tends and Challenges for the 21st Century.*
- Lynch, D. (2006). *The BrainMap: Selfware profile.* BTC: Brian Technologies Corpo-ration.
- OECD. (2018). *The future of Education and Skills 2030.* France.
- R.Gazzaniga. (1998). *The split brain revisited.* Scientific American.
- R.Owen. (1998). *Organizational Behavior in Education.* MA: Prentice-Hall.
- Ramsden, P. (1999). *Learning to Teach in Higher Education.* London, UK: Routledge.
- Soponkij, U. (2010). The ODI Impact of Leadership Styles, Shared Values and Skills on Employee Satisfaction Elements and Employee Engagement, A Case Study of a Mid-Size Company in Thailand. *Doctoral Dissertation.*
- Tayko & Preudhikulpradab, S. (2010). OD Home, An output of strategic planning workshop. *Assumption University.*
- Tayko, P. &. (2010). *Whole brain literacy: key to holistic education and success in today's world.* Dasmarnas City: I-T Partners & Linkages Inc.
- Trigwell, K. P. (1999). *Relations between teachers' approaches to teaching and students' approaches to learning.* Higher Education.
- UKCES. (2014). *The future of work-Jobs and skills in 2030.* London.
- UNESCO. (2017). *UNESCO moving forward the 2030 Agenda for Sustainable Development.* France.
- Vongbusin, V. (2010). The Impact of WBL Intervention and Interpersonal Communication Intervention on Competence-based Performance of Individuals and groups in the Architectural Design Department of A49 Company. *Doctoral Dissertation.*